2.3.19. Mission Utility and Integration

2.13.9.1. Purpose

The purpose of this test is to qualitatively assess the overall utility of the radar for the assigned mission and the integration and compatibility of the radar performance parameters, controls and display within the airplane.

2.3.19.2. General

The mission utility and integration test is the most important test of the series. During this test, mission relatable intercepts and attacks are performed to qualitatively assess the radar. The quantitative and qualitative assessments of the previous tests are used to support and justify the qualitative determinations made during the intercepts and attacks.

Utility refers to the overall usefulness of the radar as it is implemented, as an aid to the mission. The radar parameters must match the expected operational needs. Integration refers to the way the radar has been blended into the entire airborne system. From the evaluator's standpoint this characteristic is intimately tied into the area of human factors.

The qualitative assessments in mission relatable scenarios specifically called for in the previous tests are also performed during these intercepts and attacks. Care should be taken; however, to ensure that the evaluator does not get too involved in recording qualitative comments to the detriment of watching the progress of the intercept and evaluating the radar. A conscious effort should be made not to get too involved in looking for specifics on at least the first intercept and attack to ensure that an overall qualitative assessment can be made. A voice recorder can be used to make comments without distracting the evaluator from the display or the outbound run can be used to record results.

Multiple runs should be performed using different radar modes and mode combinations in as many different types of attacks as possible (including supersonic runs, if applicable, to assess the utility of the radar in high closure rate intercepts). The most likely scenarios should be performed first and others performed as flight time allows.

2.3.19.3. Instrumentation

Data cards are required for this test. A voice recorder is highly recommended.

2.3.19.4. Data Required

Record qualitative comments concerning the utility and integration of the radar. Record the effects of the parameters determined in previous tests during the intercepts and attacks as called for at the end of each test procedure.

2.3.19.5. Procedure

Place the target beyond the ranges found during the maximum detection range tests for the mode being used. Place the target 1,000 feet above the test airplane for the first run. Use the most likely long range intercept mode for the first run and the rest in order of priority as time allows. Use a medium to wide scan angle limit and a long range scale with a two to four bar pattern to simulate a search for an inbound threat. Call for the target to turn inbound and turn the test airplane towards the target. Use a mission relatable subsonic intercept speed for the first run (usually Mach (M) 0.85 to 0.9 for both the target and test airplane is adequate). It is important to use enough speed, since the closure rate will affect the evaluation of the detection range and update rate. Perform a normal intercept, optimizing the range scale, scan angle limits, antenna elevation angle etc. until the target is confirmed and an STT is acquired. Continue inbound and convert the intercept to an astern attack of the target as the target continues to fly straight and level. Use the ACM modes during the conversion and simulate the selection and firing of weapons, paying particular attention to the effects of the radar parameters and human factors upon the tactics used for each weapon.

On later intercepts, try the other long range detection modes for the initial detection and other possible combinations of modes while closing. In addition, perform some of the intercepts with the target at as low an altitude as safety permits, to assess the effects of the clutter environment. If two targets are available, use them both on at least one intercept and then split them onto two stations, switching from one to the other (three in a barrel) to maximize

the number of intercepts during the flight. If time, fuel and airspace permit, perform one supersonic intercept using a VS mode for initial detection, paying particular attention to the effects of high closure rates. If time permits, allow the target to maneuver up to 30° and 5,000 feet (excluding 1,000 feet above or below the test airplane altitude) off of the planned track without informing the evaluator of the maneuver beforehand, to simulate a moderately "jinking" target. Record qualitative comments concerning the utility of the radar for the assigned mission, including the effects of the parameters determined during previous tests and the overall integration of the radar into the airplane.

2.3.19.6. Data Analysis and Presentation

Relate the qualitative deficiencies noted to their effects upon the performance of the intercepts and astern conversions. Note any limitations upon tactics imposed by the radar parameters, utility or integration. As an example, the radar may not be able to detect a target at a range that allows the operator to set up and fire the weapons carried at their maximum range. The radar should not be driving tactics. Use the applicable results from the previous tests to support the qualitative results.

2.3.19.7. Data Cards

A sample data card is presented as card 23.

CARD NUMBER ___ TIME ____ PRIORITY L/M/H

MISSION UTILITY AND INTEGRATION

[POSITION THE TARGET ON THE NOSE AT ___ NM AND 1,000 FEET ABOVE THE TEST AIRPLANE. TURN THE TARGET AND TEST AIRPLANE TOWARDS EACH OTHER, ACCELERATING TO M=__. USE THE ____ MODE, WIDE SCAN ANGLE LIMIT, ____BAR PATTERN, AND ____ NM RANGE SCALE. GAIN AN STT AND CONTINUE INBOUND. SIMULATE A LONG RANGE MISSILE LAUNCH, THEN A MEDIUM RANGE HEAD-ON SHOT. OFFSET THE TARGET AT 10 NM AND PERFORM AN ASTERN CONVERSION. USE THE ACM MODES DURING THE CONVERSION. SIMULATE ASTERN MISSILE AND GUN ATTACKS. MAKE NOTES CONCERNING THE MISSION UTILITY, INTEGRATION AND THE EFFECTS OF RADAR PARAMETERS. REPEAT WITH THE TARGET AT ____ FEET AGL. REPEAT THE TEST WITH THE TARGET AND TEST AIRPLANE AT M=___ AND IN THE VS MODE FOR INITIAL DETECTION.]

NOTES:

Card 23: Air-to-Air Mission Utility And Integration Data Card